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Arrowhead

COMBAT DEVELOPMENTS COMMAND

May 1972

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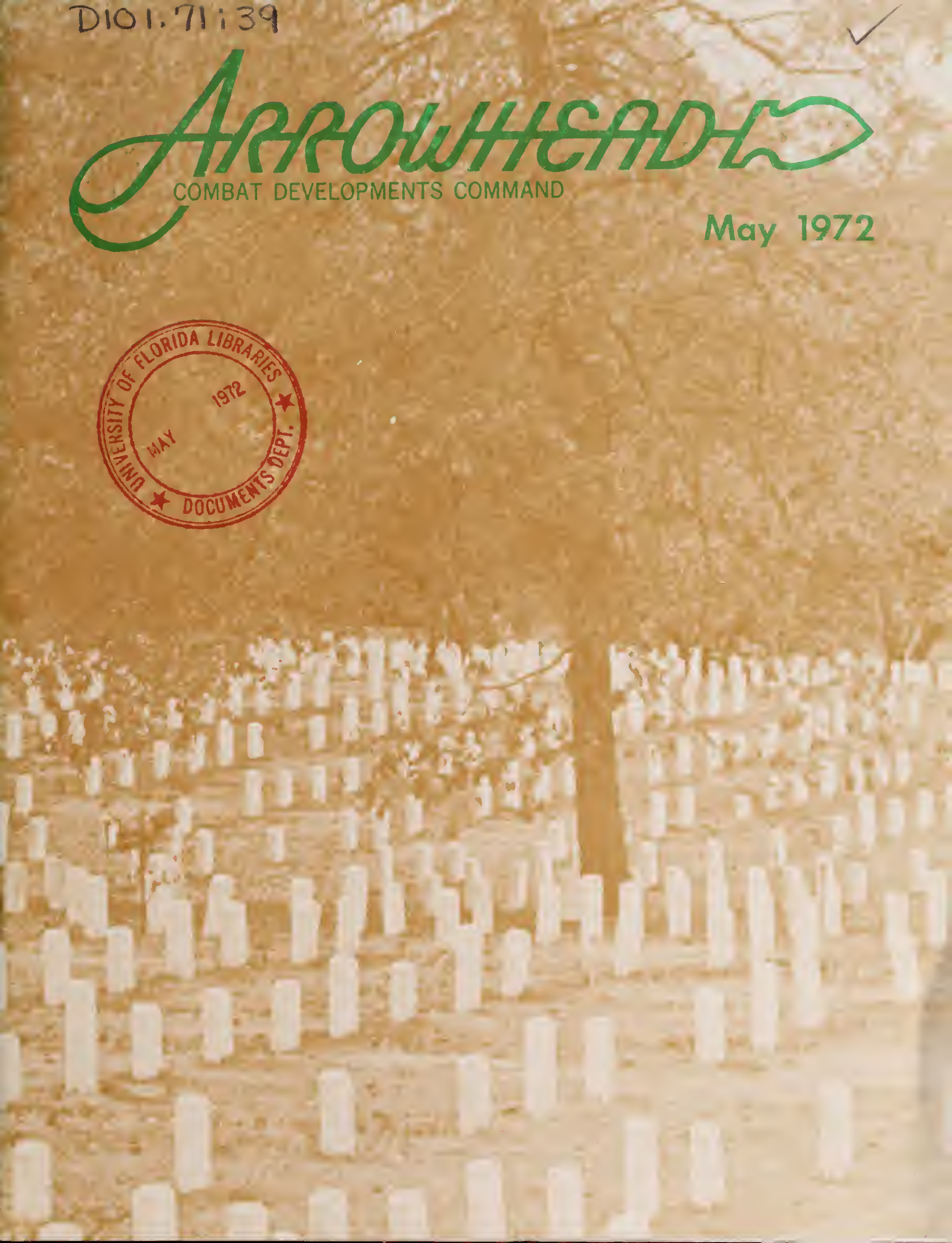

Commander's Call

The cover of this issue reminds us that we have come once again to the time of year when we pay homage to our fallen comrades-in-arms, to those who are missing in action or prisoners of war, and to all veterans who have served our Nation.

There are many traditional ways of remembering these Soldiers of other days: We recall them in our prayers, in visits to the cemetery, in parades and other ceremonies, or simply in personal reminiscences and old memories. But the best way to recognize these men and women is through our own dedication to the ideals for which they served.

We are living in a very important era in the history of America. Except for our beginning as an independent country, there has never been a time when we enunciated more clearly the desire to restate our ideals, to renew our faiths, and to follow the course they point out—the course toward peace—the course toward one Nation, under God, indivisible, with liberty and justice for all. These ideals are what the American Soldier stands for in the pages of history.

We can show the strength and solidarity of these American ideals by our physical participation in the events of this upcoming Memorial Day. I urge you to get out and be a part of this year's day of honor for the Soldier. *We must all keep faith in our Soldiers*—not just on Memorial Day but in our Army tasks *every day of the year.*

John Norton

JOHN NORTON
Lieutenant General,
U.S. Army
Commanding

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ARROWHEAD

COMBAT DEVELOPMENTS COMMAND

May 1972 No. 39

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ABOUT THE COVER

FRONT AND BACK: Arlington National Cemetery. "For freedom they were willing to die. On this Memorial Day we should all reflect upon the price these men paid to keep us free."

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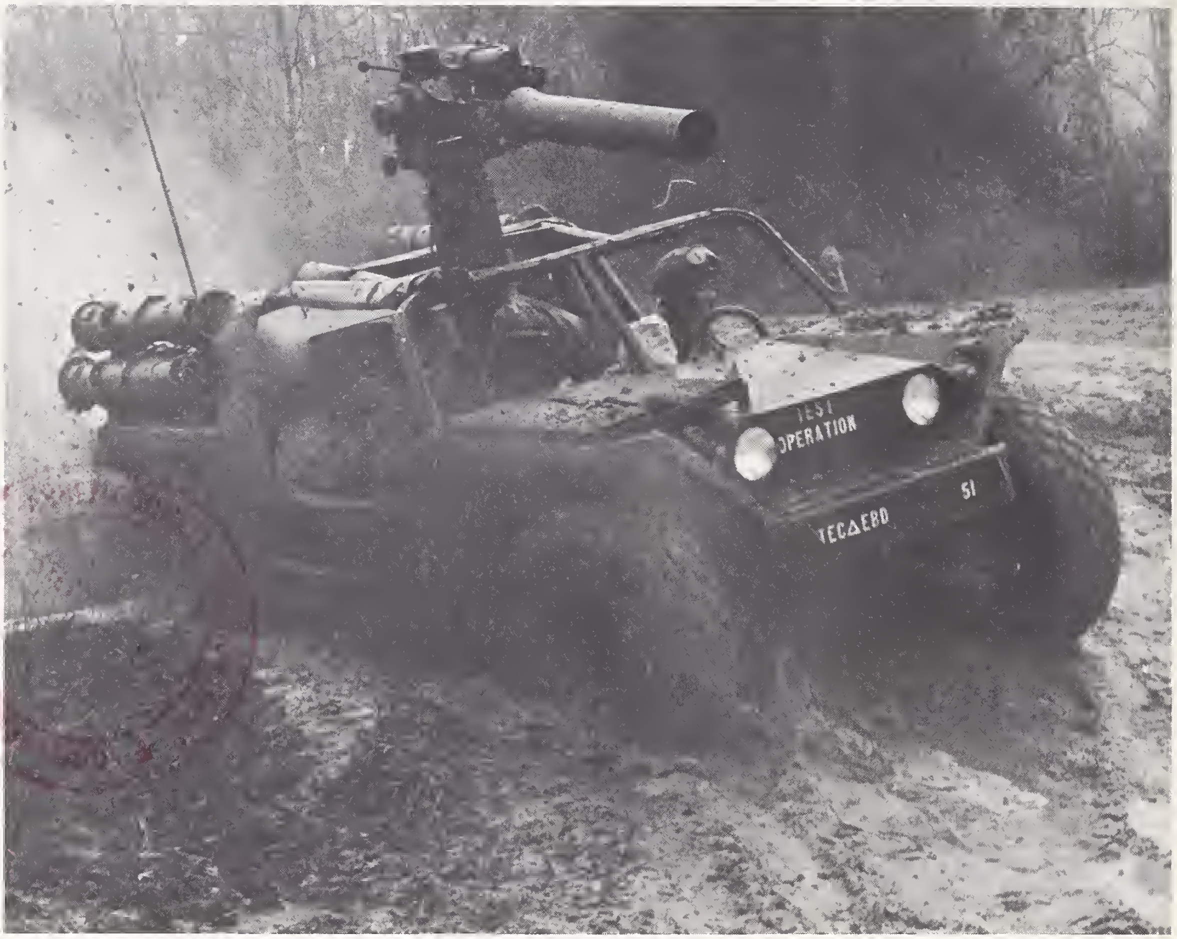


"Neither rain, sleet, mud, nor snow . . ."

Dirt roads, deep drainage ditches, mud, swamps and stream crossings characterize the rugged terrain at Ft. Knox, Ky., where the XR-311 was run through a series of tests to determine its military potential.

The XR-311, sometimes tagged the "dune buggy", is a vehicle developed by Food Machinery Corporation (FMC) and funded by the Army for use in military potential tests at Forts Knox, Benning and Gordon.

The first tactical test phase of the XR-311 took place recently at Ft. Knox, Ky. The vehicle was tested at Ft. Knox to determine its potential as a reconnaissance vehicle. However, it was also being tested as part of a heavy cavalry platoon. In this new concept, vehicles are not only equipped for scouting missions, but also are equipped to employ ambush techniques using TOW missiles against an agressor force.

According to Major Arthur W. Garrett, the XR-311 project officer from the Combat Developments Command Armor Agency, "The Agency is only responsible for testing the vehicle as far as route reconnaissance is concerned, but there are some aspects of a security mission thrown in. It is rather broad and we are meeting this requirement by going into a concept organization of a heavy cavalry platoon that has the capability of both reconnaissance and some offensive actions."

M114s were used as base line data vehicles.

A common sight throughout the testing.

The concept of a heavy cavalry platoon was examined on a limited scale due to lack of time and resources. For this reason, no strong conclusions could be made.

There was some cross country mobility testing done so that a comparison could be made of mobility, vehicle signature (visual and sound detection of vehicle), human factors engineering (how the vehicle configuration is set up, various equipment in the vehicle, how easy it is for the crew to enter and exit the vehicle during a tactical situation), and techniques of employment.

The M151A1 (scout jeep) and the M114 (armored reconnaissance scout vehicle) were used as comparison vehicles to collect this data. These vehicles were used because they are both wheeled and tracked, common to many military units, and seem the most likely candidates with which to develop any comparison data.

The 13 mile test course contains one improved dirt road, steep slopes, deep drainage ditches, stream crossings, unimproved gravel base roads, and a cross country section through swampy areas with light vegetation.

The vehicles were arranged in a scout squad of two vehicles, which started the problem by making a normal route reconnaissance of the area.

Added to the scout squad was a third vehicle, which served as a control vehicle (scout controllers) to make sure that the scouts actually performed the mission dictated, using normal and approved tactics, techniques and procedures.

Seven data collection points were set up along the route that the vehicles followed. The personnel located at these points (within varying distances of 70 to 1,000 meters from the test vehicle route) were assigned the mission of trying to detect the test vehicles, either by sight or sound.

XR-311 HITS ROUGH TERRAIN HEAD-ON

BY LT. GARY R. STEIMER

Each element of the test personnel (drivers, vehicle commanders, scout controllers, aggressor personnel and data collection point personnel) were required to complete a checklist. This enabled each one of the separate groups within the test structure to compile its own data checklist, consisting of remarks or questions that were applicable to the particular data each element was collecting.

Questions common to all checklists included such statistical data as weather conditions, ground conditions, and time of test. Each time a test vehicle ran through the course a new checklist was used. A major part of the checklist dealt with environmental and ground conditions, or anything that might interfere with detection of the vehicle, such as ground fog, ambient noise level from civilian vehicles working in the area, or from any other military vehicle being tested in the area. It was important that the personnel indicate any noise in the test area that might interfere with their detection of the vehicle.

The data collection points were primarily interested in detecting the visual and aural signatures of the vehicle.

In order to check the data, the participants indicated the time they heard or observed the vehicle. "By doing this we could go back and check out the times used by the test vehicle controllers and we knew where they were in relationship to each checkpoint and each data collection point, as far as the time element was concerned. We asked them to try and identify the vehicle, and by identification we could then tie them to the point by requiring them to determine how many personnel they could see in the vehicle, what type of weapons it was carrying, and the direction of movement", said Major Garrett.

The data obtained from the test personnel was then double-checked against the vehicle running the course at that time to determine if the observer actually did hear or see the test vehicle, or if it was some other vehicle that might have been operating in the area.

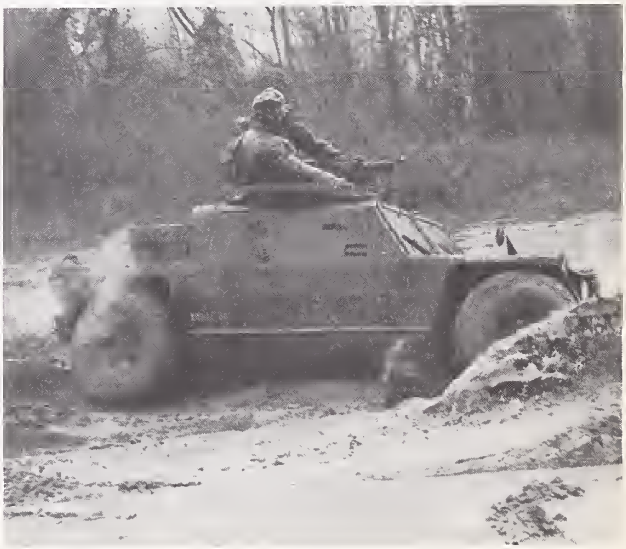
The testing of the XR-311 done at Ft. Knox was strictly a military potential test, and not the type of test that CDEC would be organizing or running.

According to Major Garrett, "All we are doing here (Ft. Knox) is getting a foot in the door to determine if it is feasible for further testing. There is no way that we can tell from the data collected here to say it is a fine vehicle and better than any other of its kind, and then go ahead and determine the type of issue we are going to make."

"If the XR-311 does show signs of potential, the test program would be passed along to an organization better equipped to organize and conduct a testing program", said Major Garrett.

There may be some question as to why the XR-311 is being compared to the M114 and the M151. In this regard, the M114 and M151 are simply base line data vehicles. Both are common to field units and will provide a comparison for track and wheel capability. "The test purpose is not to select a replacement for either the M114 or the M151, but should the XR-311 prove more versatile and more effective in the role currently performed by them, it might well become

Major Garrett, CDC Armor Agency Project Officer, briefs team members before the testing begins.



Armored version of the XR-311 negotiates a water obstacle.

"After twenty minutes of testing on the muddy terrain at Ft. Knox, the crew was dripping wet and covered with mud."

a replacement candidate. The XR-311 came about as an unsolicited proposal—it is a high mobility vehicle that FMC designed and then asked the army to examine in regards to military potential. At this time, military potential is our prime objective," a spokesman said.

"It might be that as a result of the evaluation it could be concluded that this vehicle possesses more mobility than say the M114 and has quieter signature. The inherent maintenance problems can be overcome, and, if this were the case, it might very well be a candidate, but a military potential test is not going to give you all the answers or the data necessary to make these determinations. This gets into the full-blooded complete field evaluation tests", Garrett said.

In relationship to the testing being done at Ft. Knox, Major Garrett said, ". . . here at the Armor Agency we are looking at the XR-311 purely from a standpoint of does the vehicle have some potential, and in that regard we are not as concerned with maintenance and reliability as you would normally be with other types of tests. This is a first family (so to speak) type of vehicle—one that has come off the shelf, and it is pretty well expected to have quite a few problems."

One of the purposes of a potential test is to

"During cold weather when water splashes upon the exhaust system a very large cloud of steam rises, which gives the vehicle a very unique and pronounced signature."

collect data in regard to design and performance malfunctions. With the XR-311 there are many design problems. One of the XR-311 test vehicles contains a ring mount, for placement of a .50 caliber machinegun. The purpose of this is to have a field of fire of 360 degrees. But for a gunner to accomplish this in the XR-311 he has to walk over the head of the vehicle commander and driver. There is no place for the gunner to really sit and be in a position to fire the weapon.

Another problem that Major Garrett pointed out to the Analysis Group (at the Armor Agency), and the Armor Engineer Board, was the exhaust system on the XR-311. During cold weather when water splashes upon the exhaust system a very large cloud of steam rises, which would be very noticeable to an aggressor, since it gives the vehicle a very unique and pronounced signature. "If this were pointed out in a materiel need document, I am sure that the design characteristics would be changed, where the exhaust system would be protected from the water, or whatever would be necessary to eliminate that particular signature," Major Garrett said.

The design of the fenders on the XR-311 creates another problem, for it allows the vehicle to throw water and mud all over the vehicle. After 20 minutes of testing on the muddy terrain at Ft. Knox, the crew was dripping wet and covered with mud. "As it is set up right now," Garrett said, "this is a definite problem that must be eliminated."

The XR-311 rides so smoothly over rough terrain that the riders do not actually feel the

The unique capabilities of the XR-311 enabled it to help in the recovery of many disabled M151s (above). The driver (below) temporarily abandoned his vehicle while recovery operations took place.

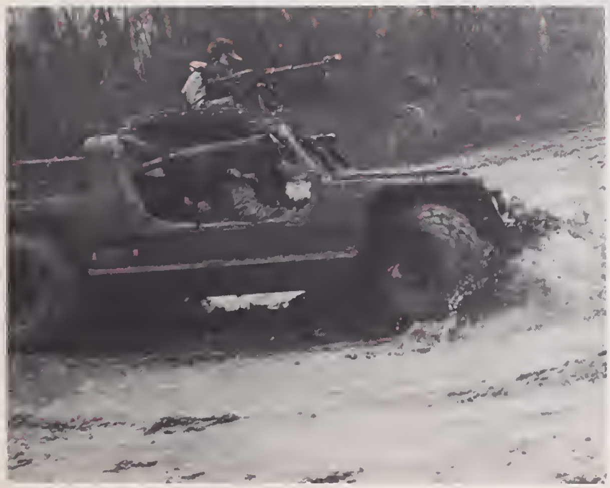
shock of the vehicle. "As a result the driver does not realize the punishment he is putting on the vehicle, because he just skims right over the bad terrain. This is one of the more noteworthy features of the vehicle which is actually an asset in some ways, but in others it is somewhat of a handicap," Major Garrett said.

The testing of the XR-311 has just begun. There are many other concept type applications of the vehicle that must be examined. These include: convoy escort vehicle, combat control vehicle, security patrol vehicle, front line ambulance and anti-armor vehicle with appropriate weapons systems.

If favorable findings are noted by the tests at Forts Benning, Knox and Gordon, the XR-311 might well become an addition to the Army's vehicle inventory of tomorrow.

XR-311 IS PUT TO THE TEST

Shown at right, are two XR-311s in the attack phase of the testing. With the use of a ring mount there is no place for the gunner to really sit and be in a position to fire the weapon (below and lower right).



Orienteering Tests Mind and Muscle

By LT. Robert H. Davis

What is Orienteering?

The sport of cross country orientation, as it was first termed by its creator, has been described in many ways—cross country running with a purpose, land navigation over unfamiliar terrain, competitive "way finding", a car rally but done on foot and many, many others.

Bjorn Kjellstrom, the father of orienteering in North America, explains, "Orienteering in the fullest sense of the term is an outdoor program. It covers a great variety of practice methods, games and contests through which the correct and intelligent use of the map and the compass is taught. The Orienteering program can be subdivided into two main parts. Specifically, there are the educational and theoretical aspects, which develop skill in map reading and love for the out of doors. There is, on the other hand, the expanded development of this into a competitive sport with different variations ranging from simple recreative contests, preferably combined with conservation and nature lore, to the more intricate cross country races."

It is readily apparent that orienteering is much more complex than cross country running or just map reading proficiency. It requires the endurance and stamina of a distance runner, the intelligence of a chess player, decisiveness under physical and mental stress, initiative and confidence. And yet the preceding discussion does not encompass the totality of the concept. Orienteering is a natural sport that opens the door to other activities, such as wilderness exploration, hiking, hunting, fishing or ski touring.

It is currently being utilized by military organizations of Sweden, Britain and the United States to train personnel in map and compass reading. The program within the U.S. Army is just beginning to blossom, both as a competitive sport and as a training vehicle. Orienteering was first used for military training in the United States at the U.S. Marine Corps Physical Fitness Academy and the U.S. Military Academy in 1967. It was added to the program of instruction at the Engineer School at Ft. Belvoir, Va., and at the Infantry School at Ft. Benning, Ga., in November 1970. Orienteering teams from the Army and Marine Corps have dominated all competition in the United States and, in 1970, dominated the Canadian Championships, as well. Traditional military teaching methods involve hours of classroom work where students juggle problems concerning intersection, back azimuths, declination constants and individual compass errors, all of which tend to completely baffle the average Soldier and leave him terrified of map reading. Any practical application he may receive is done from the side of a hill with a magnificent panorama and consists of identifying terrain features visually and then on a map. The cold weather compiled with this unimaginative approach limits any enthusiasm for the subject.

Under the Orienteering concept two basic assumptions are made. First, map reading is an outdoor subject that should be instructed only in the field. Secondly, it is considered a personal subject which can be perfected only with practice, so orienteering competitions comprise the greater part of their training syllabus. The Swedish Army has had excellent results with this method in teaching map reading over some of the most difficult terrain in Europe.

HISTORY

Orienteering as a competitive sport was born in Scandinavia in the late 1800's. In these first years, Orienteering was primarily a mili-

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Military personnel (above) go through the various stages of orienteering in preparation for Vietnam assignments. The orienteering briefing, above, was in the S4 area at Ft. Belvoir, Va.

tary event and used as part of military training. It was not until 1919 that the modern version of orienteering was born in Sweden as a competitive sport.

Major Ernst Killander, who was president of Stockholm's Amateur Athletic Association, had noticed the difficulty of retaining the interests of Swedish youth in track and field sports. In searching for a solution to regenerate this lagging interest, he decided to use the natural environment of the Swedish countryside with its many forests, hills, and lakes for a new type of sport in which the runner not only ran a course, but also had to pick and choose his route from a map, and called it the Sport of Orientation. On March 25, 1919, Major Killander held the first competition outside of Stockholm, and had 220 participants show up to compete. A new competitive sport had been born, and Major Killander can be rightfully called "the Father of Orienteering."

During the 1920's, the sport spread rapidly across all of Sweden. These early Orienteers competed with maps that were not very accurate nor detailed and usually of the scale 1:100,000. Their compasses were either wooden box types or the conventional watch shape. It was not until the early 1930's that this new sport received a technical boost from the invention of a new compass, more precise and faster to use than those existing. This was the modern protractor type compass. Responsible for the development of this new type of compass were the Kjellstrom brothers, Bjorn and Alvan, and their friend, Gunnar Tillander. This commercial aspect of the history of Orienteering cannot be overlooked because it is a fact that the Silva compass system did not only introduce more accurate and precise compasses but also a completely new and simplified system of teaching map and compass techniques. The new compasses, teaching methods, and games developed, made it possible for youngsters from 6-8 years of age to easily learn map and compass techniques and then use them in Orienteering games. With this broad base of young Orienteers in the 1930's, the sport really started to mushroom all over Scandinavia. The first official Swedish championships were Organized in 1935, and the Swedish Orienteering Association was formed in 1938.

Orienteering was brought to the United States in 1946 by Bjorn Kjellstrom, the former Swedish Orienteering Champion, on November 24 at the Indiana Dunes State Park in Indiana. Mr. Kjellstrom had introduced the sport to some Boy Scout leaders in Indiana through his lectures, enthusiasm, and interest in youth activities. Since that day interest remained but the sport did not grow in the United States. It's weak point was lack of knowledgeable organizers, backers, and local enthusiasts willing to put in the time and effort to teach the technique, explain the sport, and lay out the courses. A similar situation existed in Canada, where Bjorn Kjellstrom introduced the sport in 1948. The real missionary of the sport in Canada was Professor Alex "Sass" Peepre, a Physical Education Professor at Ontario's Guelph University. In late

August of 1966 the nucleus of the Canadian Orienteering Association was formed. At the same time another committee was also formed under the Canadian Association for Health, Physical Education and Recreation, with Alex Peepre as chairman. This guaranteed government support to the Orienteering program. The first official Canadian Championships were held north of Ottawa in August of 1968.

In 1967 the U.S. Marine Corps Physical Fitness Academy sent an observer to an orienteering event at Guelph, Ontario, set up by "Sass" Peepre. This led to the beginning of the study of the sport and its potential at the Academy and has resulted in a complete program on orienteering for the U.S. Marines. This visit also generated a competitive interest and in 1969 an Armed Forces team of four Marines and three Army personnel participated in the 1969 Counseil International du Sport Militaire (CISM) World Orienteering Championships. This first team didn't fare too well as they were beginners but the experience helped their preparation and participation in the 1970 CISM Championships in Denmark in which their showing was better.

At the United States Military Academy, West Point, New York, Orienteering is an individual intramural sport among the cadets and is also used as a land navigation training vehicle. Southern Illinois University at Carbondale in October 1970, sponsored the first U.S. Civilian Championships. Southern Illinois University now offers an Orienteering elective at the freshman and sophomore level in its physical education curriculum.

Orienteering is rapidly attaining "Olympic Status." Ski Orienteering since 1949 has been on the Olympic Program. The International Orienteering Federation is looking into the possibility of having it organized at the Denver Winter Olympics in 1976. The IOF is also working on having Orienteering as a demonstration event at the Munich Olympic Games this year.

TYPES OF COURSES

Freestyle Orienteering is the most common type of competition and is considered to be the most competitive and intriguing of all events. In this event, all competitors must visit the same controls in a specific order. Competitors are normally started in 2 or 3 minute intervals thereby making it a contest of route choosing and physical skill. The winner is determined by the contestant who has been to all the controls and has the lowest elapsed time. The length of the course will vary with the degree of expertise of the competitors. However, there are usually six to twelve controlmarkers located on the course in varying degrees of difficulty and distances apart. Regardless of the level of competition, all competitors must indicate on their event cards positive proof of visiting the control markers. This is usually done by ink stamps, code letters, or punches.

Score Orienteering is the second major form of orienteering. The area chosen for the competition is covered with a large number of control points. The controls near the start/finish point have a low point value, while those more distant, or more difficult to locate, have a high point value. The competitor is required to locate as many control markers as he can within a specified time (usually 90 minutes). Points are deducted for being on the course longer than the specified time. The competitor with the highest point score is the winner. The course is designed to ensure that there are more control points than can be found during the allocated time. A good competitor must be able to coordinate time and distance with his ability in land navigation in running the course.

Line Orienteering is similar to the freestyle event with one major difference. In freestyle orienteering the location of each control point is known, leaving route selection to the individual competitor. In line orienteering the route is provided with the task being to give the exact location of the control points that are placed along the route. The competitor who completes the course in the fastest time, with the most points visited and accurately plotted, is the winner.

Project Orienteering fits into the competitive forms quite readily, as it can be a variation of any of the forms discussed. The competitor is required to perform a project for a grade at each control marker. This type of competition is particularly suited for training or testing various military skills.

Relay Orienteering is excellent for building unity and esprit de corps, in addition to improving orienteering skills. Each member of the team runs a freestyle or line orienteering leg from 2 to 3 miles long. When the first team member finishes his leg of the course, he gives the map and team control card to the next member of the team, who races off orienteering on his leg. Where conditions permit, separate legs may be used for each member of the team. Normally the relays are three-man team events. Of course the winning team is the one which has successfully located all the control points in the least amount of time.

Night Orienteering involves cross-country navigation with the regular items of orienteering (a map and compass) plus a flashlight and whistle for safety. For military training, night orienteering may be a dead reckoning navigation exercise or a limited visibility map compass exercise over relatively easy terrain on moonlight nights.

METHODS & TECHNIQUES

Typical of every sport competition, it produces certain methods and techniques that are consistently more successful than others. Naturally the top competitors adopt these proven methods and techniques and further refine them until a basic foundation of expertise is developed. Although Orienteering is relatively new in the United States an exten-

Congolese NCOs being briefed on orienteering by Capt. Hawk, during their recent visit to Ft. Belvoir.

sive array of sound principles have been borrowed from the Scandinavian countries.

Probably the simplest method used to travel from one control point to the next involves establishing a compass bearing and following that bearing until the point is reached. A variation of this technique is to establish a bearing to be followed for a specified distance at which time a new bearing is established. This method is particularly effective when the distance to be traveled is short and is virtually a necessity when traversing flat wooded terrain. Following a specific azimuth is time consuming, consequently, the use of "steering marks" is a valuable aid. A steering mark is defined as a prominent object or terrain feature on the ground that is on the azimuth to be followed. If the orienteer becomes proficient at this, he should be able to continue to select "steering marks" ahead of him as he runs by aligning several (2 or 3) of his marks with a new one. The savings in time will be about 15 to 20 seconds for every compass check not needed.

Another particularly valuable technique is "aiming off" and is used when the destination lies along a linear terrain feature such as a road or stream. Due to errors in compass or map reading one may reach the linear terrain feature and not know whether the objective lies to the right or the left. However, by deliberately "aiming off" to either the right or left the direction of the objective will be known when the linear feature is reached.

When a control point is not located on a prominent terrain feature that is easily identifiable, an "attack point" should be used. This technique entails selection of a prominent terrain feature such as a hilltop or road junction near his object. The purpose of this technique is to minimize the distance that has to be traveled on the final approach, thereby minimizing errors in compass work or pacing. The "pace" is the standard distance unit used by the orienteer. An integral part of determining where you are is knowing how far you have traveled. It is never wise to rely totally on features appearing on maps when judging distance because they may no longer exist.

"*Geographic orientation*" or "collecting features" involves keeping the map orientated as you travel and remember what terrain features you will encounter enroute to your next control point.

Finally, a properly laid out course will normally have some of its controls separated by an elevation type obstacle, be it a steep valley or a hill. This causes the orienteer to make the decision of which is the fastest—detouring or climbing. As a rule of thumb for the amount of energy expended to decide such a question, use the following: a 25 foot climb equals 100 meters on the flat. Say you must decide whether to detour a 500 meter leg or to climb a 100 foot hill to reach the control. Then, the 100 foot climb would be equal to 400 meters (using the formula) plus the actual ground distance of 270 meters or a total of 670 meters. Therefore, the orienteer selecting the 500 meter detour saves 170 meters. But, be sure to study each leg carefully, evaluate your fitness, and consider time.

Engineering Officer Basic Course students mark their clue sheets with symbols from marker during orienteering exercises held at Tompkins Base, Ft. Belvoir.

CONCLUSION

Orienteering is a sport for all ages. It is designed for the athlete as well as the intellectual and it is not often that an athletic event is called the ideal "Military Sport." The military asset lies in its potential as a training vehicle, for it requires the participant to be a master of many Soldierly qualities: physical fitness, determination, map reading, compass work and mental alertness. Orienteering is an innovation in training techniques and will motivate military personnel to improve their physical fitness while mastering map reading and compass skills.

DOES ANYBODY REALLY KNOW WHAT TIME IT IS?

"All right men, let's double time it off those planes. We still have to march five miles before we get to our assembly area."

"But Sarge, we've been sitting on that plane for over ten hours. We're too tired to do any marching."

"What do you mean too tired, it's only 0800."

"Sure it's early in the morning here, but back in the states it's night time already."

"Stop your beefing Private, we're not back in the states. Now get your gear on and get ready to move out ASAP."

"Come on Sarge, can't we have a rest break, it's awfully cold here."

"Don't worry about that, the march will wake you up and warm you up."

"But Sarge, I can't even keep my eyes open."

"Not enough time to sleep now, you should have slept on the plane."

"We couldn't, and besides we have a right to be tired. We just passed through several time zones, and we're not used to the climate either."

"Come on Private, what do you know about fatigue, acclimatization and time zone changes?"

The above question cannot be answered in its entirety in a straight forward manner. In the first place, the topic encompasses several different but inter-related areas and is a broad subject. An answer, or answers, to the question, can be made in several ways, e.g. yes, we know quite a bit about fatigue, or acclimatization, or crossing time zones rapidly, or we know very little about fatigue, quite a bit about acclimatization, and perhaps some about spanning time zones. Perhaps the best answer would be: we do not know enough about these subjects and that we need to know more, especially if we want to have tangible information for military planners to use. And this is sorely needed—more reliable data for military operational planning in these areas.

One of the things we should do before we proceed further is to define our subject, or subjects, and the ramifications of each. Fatigue has many facets. There is whole body fatigue, fatigue of the mind—mental fatigue, auditory fatigue, visual fatigue, etc. Physical fatigue is an all encompassing thing that cannot be readily defined. It may be caused by overwork, or work without rest, lack of sleep, lack of recreation, lack of proper diet to provide fuel for the work, or there may be an illness, such as an infection, or anemia, that will potentiate or speed up the onset of fatigue. You can probably remember when you had a cold, or "virus", perhaps with diarrhea and a loss of fluids, a lack of appetite, poor sleeping because of a cough, or goofed up somewhat by antihistamines that cause some people to lose sleep. And if you did what too many people do—attempt to continue working that normal 8 hour day—you probably pooped quite readily and you know that fatigue can severely limit your endurance—or output—productiveness—call it what you may.

What is acclimatization? It is adapting to a change of environment. You have heard of "becoming acclimated." In other words, your body has to adjust to change of temperature—hot, cold, and to altitude. There are subdivisions of these environments—there is the hot wet climate, the jungle, and there is the desert where dry heat prevails. Cold environments are usually not as divisable into dry or wet as most cold air reduces the moisture content, but extreme cold temperatures are more concerned with wind versus no wind—chill factors, etc. Altitude changes are divided into below sea level, or hyperbaric conditions, and above sea level, or high altitude, low barometric pressures. The submariners and under sea explorers are interested in below sea level atmospheric problems, while aviators and astronauts are concerned with ex-

Loading onto plane . . .

Flying across the Atlantic . . .

tremely high altitudes, approaching vacuums. For the movement of large numbers of troops, we are interested in knowing about altitudes in mountainous, high plateau areas, say from 8 thousand to 14-15 or 16 thousand feet. Most of these altitudes produce temperature aspects—if the high altitude is in the tropics, the change may produce a pleasant mild temperature, but extreme altitudes, whether or not in the tropics and in the temperate zones, will add to the altitude effects and then will be the problem of cold adaptation.

Asynchronosis, or a lack of synchrony, is the lack of events taking place at the intervals of time we are used to. This happens during rapid time zone changes, as with a flight from the U.S. to the Orient, or to Africa. Our body has various timed rhythms that we have habituated into ourselves. We are geared to the eight hour work day, 6-8 hours of sleep, and in between each a break of several hours. These and other rhythms form into the so-called circadian rhythm, or the circle rhythm of a 24-hour day. Moving across time zones disrupts these rhythms and the resulting asynchronosis is well known to long distance rapid transit travelers.

Now, what do we know about these topics? First, fatigue. Let's start with the easy, or more positive. Auditory fatigue, the reaction or response to high intensity noise, particularly high decibel fatigue, has to be qualified by the frequency, and mixed frequencies, and time or duration, which affects different parts of the ear, or hearing apparatus. Deafness, which may be brought on by noise fatigue, usually affects the nervous interphase of hearing, where the mechanical impulses are transmitted from the eardrum through the bony ossicles to the neural hair cells. This is where mechanical energy is changed to electrical energy or electrical impulses to be transmitted to the brain. The effects of auditory fatigue, and the means of protection, have been pretty well worked out. The main problem in auditory fatigue is for the trooper to be aware of the need to wear ear plugs, or hearing protectors, and for the commander to enforce the use of protection.

As far as visual fatigue, it is usually no more than an aggravation, ending with a headache, or redness of the eye—"eye fatigue." From usual fatigue—too much reading, or improper glasses, there is little or no damage to the eye. If we are dealing with high intensity flash, as with arc welding, or a nuclear detonation, laser beam exposure, or even prolonged direct sunlight, then this is something else, and can be permanent. But the usual encounters of the trooper are of little importance unless nuclear engagements are undertaken.

The vast majority of fatigue—whole body, or physical fatigue, is a big subject with large gaps in our knowledge. Fatigue is modified by motivation, anxiety, physical conditioning, discipline, etc., as well as the already alluded to health status of the individual—infection, anemia, etc. Stress or endurance factors further complicate the picture. It is difficult to relate studies done under laboratory conditions to field situations.

Landing in Europe . . .

Another mode of transportation . . .

Little authoritative, or practical knowledge, has been gained from the studies concerning sleep deprivation. Inconclusive results have been derived from stress or endurance studies with sleep loss for 22, 48, or 72 hours because the statistics, or results are difficult to quantitate, and the motivation, discipline, inducements, environment have made similar studies disagree with each other. We have found out the subjects work best if they have conditions to which they are most accustomed. Although some adaptations and changes can be brought about, these changes are not of any great magnitude. Drugs can prolong endurance, but side effects such as individual reactions, allergies, or personality reactions to drugs, make their use less than ideal.

As far as acclimatization, we have not been able to speed up too much the time it takes for the body to adapt to environmental changes. A certain period of time is needed for the body to make more red blood cells to engulf more oxygen from the thin air at high altitudes, and nothing much can be done to alter the time necessary to produce these changes. Drugs do little, and again they do not have entirely safe features. The time necessary to condition the body for hot or cold climates is likewise not too negotiable. But we can pre-condition man without moving him. For example, altitude chambers can be used to precondition for altitude changes, and various hot or cold climates can be produced locally to adapt personnel about to be moved to a different climate. And we know that individuals in good physical condition adapt or acclimate somewhat more readily and have an easier time of it. So although we do not know too much about altering the necessary time for acclimatization, we do know the reasons "why" and have tangible statistics that can be provided to military planners.

Asynchronosis varies with the distance moved and the rapidity of the change. Some people seem to have little trouble with travelling, but most individuals find they cannot sleep when they ought to be sleeping in order to conform to the new location's routines of day-night or work-sleep cycles. Perhaps drugs can be used beneficially to speed up this adaptation—sleeping pills, one or two nights, plus a preconditioning program of altering the work/rest cycle. But for a trooper to be able to be moved rapidly over an extensive distance and immediately engage the enemy as an alert individual, is not a reality as yet. But it is not the big bugaboo that acclimatization is, as far as time is concerned. Before we go on though, we should realize that with distance changes, alterations in the individual may be predestined by personality types, thus "travellers disease" may see an individual unable to think well. For several days this may plague him and will be added to his lack of sleep. So the picture is not entirely rosy.

Now that we have looked at these three areas individually, how about putting them altogether? What about a large troop movement from temperate or semitropical U.S. to a high altitude

Still on the move . . .

Waiting and waiting and . . .

cold climate? The movement is rapidly made to half way around the world, and then the enemy had to be fought steadily for several days without any darkness let up, as both sides have sophisticated night equipment.

Take this typical picture—the time before the move is frequently not used correctly—instead of resting, the troops may celebrate before take-off. The trip is made in a hot, stuffy airplane without proper humidity or temperature controls, the humidity may be from 0-15 or 20% (optimum about 45%), with temperature variants from freezing to 90 or even over 100°F. Stops are made for aircraft maintenance—not troop rest or relaxation, and the uncomfortable seats do not afford sleep. Dehydration from the alcohol of celebrating is further increased by too much coffee, and with grunt sandwiches (cheese, dry bologna, ham), constipation usually prevails. Throughout the trip aircraft noise has battered the troops hearing so that when they arrive at their destination they have difficulty with commands. So under usual present day circumstances we have troops arriving at their destination pretty well beat. Add altitude change, cold temperatures, and continuous operations—and we have problems.

This is a complicated picture. But the scene is more and more apt to be true. We have seen similar situations before, at times disastrous, e.g. the Chinese in their border conflict with India learned about altitude in a costly fashion. Had they planned for such an event by using knowledge that was available? The answer is obviously no. We cannot afford similar mistakes.

Without sleep . . . can he effectively perform?

The Medical Service Agency, CDC, is presently undertaking a study called FAASTO, or *Fatigue, Asynchronosis, and Acclimatization in Sustained Tactical Operations.* This study intends to assimilate the knowledge available related to these subjects and convert it as much as can be into doctrine, or policy, for use in AR's, pamphlets, or manuals that military planners may use for troop operations.

WHAT IS THIS?

see page 24

TANKERS THINK TANK:

THE MBT TASK FORCE

Editor's Note: Lt. Robert H. Gregory called on Colonel Charles K. Heiden, Deputy Director of the Main Battle Tank Task Force at Ft. Knox, Ky. The Task Force was just getting underway and Colonel Heiden graciously gave the *Arrowhead* the following comments on the MBT Task Force's purpose.

ARROWHEAD: What is the MBT Task Force?

COL HEIDEN: **The MBT Task Force is a group of officers and professional civilians who have been assembled from all over the Army. It works directly under the Commanding General, Combat Developments Command. The director of this Task Force is Major General Desobry, Commanding General of the Armor Center. In his position as director of the Main Battle Tank Task Force, he has been designated as a Deputy Commanding General of Combat Developments Command. I am General Desobry's Deputy Director on the Task Force. The personnel for the Task Force have been drawn from the Combat Developments Command, from the Continental Army Command and from the Army Materiel Command, with several people being drawn from the Department of the Army Staff. We are located at Ft. Knox, Kentucky, in the same building as the Armor Agency is located.**

ARROWHEAD: Colonel Heiden, what do you hope the MBT Task Force will accomplish?

COL HEIDEN: **Well, we hope we accomplish our mission, which is to put together an overall Army tank program which integrates the current inventory of tanks in the Army, their product improvement and investigates the requirement for a new Main Battle Tank. If we find a new Main Battle Tank is required, then we must put together a materiel need document for a new Main Battle Tank.**

ARROWHEAD: What has the Army gained or lost by the shelving of the XM803 Program?

COL HEIDEN: **Well, we've gained several things. The first thing we've gained is some rather significant advances in tank technology that resulted from the XM803 program. Although the program started out initially with the Federal Republic of Germany as a joint program, as I think you are aware, over a year ago the joint program was terminated and the United States began a unilateral Program to develop the XM803. The XM803 was a completely new tank from the ground up. It incorporated many of the latest advances in tank technology. From this I believe the Army Materiel Command drew a great deal of experience and a great deal of knowledge. All that experience and knowledge will be able to be applied to any new tank program. We did have some problem areas in the XM803. At the time of the termination of the program, most of these problem areas had been worked out. We**

. . . the loss to the Army due to the termination of the XM803 program is primarily one of time. If we must begin again with a new tank development program, it takes time to design, test, and ready for production a new tank.

will draw from the XM803 program a great deal of knowledge that can be applied, but the loss to the Army due to the termination of the XM803 program is primarily one of time. If we must begin again with a new tank development program, it takes time to design, test, and ready for production a new tank. We, of course, must adhere to the guidance provided by the Congress when they terminated the XM803 program.

ARROWHEAD: You mentioned that a lot will be gained from the XM803 Program. What items already tested on the XM803 will be applied to the M60 in the MBT Task Force?

COL HEIDEN: **To the M60 the major element found from the XM803 Program will be the laser range finder which was already under development for the M60 tank. The M60 program is restricted somewhat by the tank envelope; and by tank envelope I am speaking of the hull and turret configuration of the M60 tank. Fortunately, we also have the M60 A2 tank which will go into production within the next year. We believe that combination of the product improvement of the M60 A1 and the introduction of the M60 A2 Tank gives us time to take a look at an advanced main battle tank to determine exactly what it should be within the parameters of the guidance that the Congress has given us.**

ARROWHEAD: The MBT Task Force, from what I've seen, is a 6 month program. Is this somewhat of a restraint?

COL HEIDEN: **The schedule date for the completion of our project right now is 1 August of this year. Yes, it is a constrained time, it means that we must make the maximum use of all the previous work that the Army has done in developing a tank program. We don't have time to plow out new ground and we certainly don't have time to reinvent the wheel. It means we have to take advantage of the many task studies that the Army has done and the many computer simulations the Army has done on the tanks. But particularly, we have to take advantage of the knowledge and experience of the key people that have been assigned to the Main Battle Tank Task Force.**

ARROWHEAD: Colonel, you say key people assigned. Were any of these people formerly working on the XM803 or are they new people?

COL HEIDEN: **We have some people who worked on the XM803 tank program. Colonel Grant who is the Chief of the Components and Evaluation Team of the Task Force was the Deputy Project Manager on the XM803. LTC Coyle has worked previously on the XM803 and on the M60 program. LTC Garthwaite is from**

Effectively looking at the new tank design, it may well be that it is more economical for the Army to look at the overall program.

the M60 Project Manager's Office. With very few exceptions, the officers that are assigned to the Task Force are all experienced Armor Officers. The civilians who are assigned to the Task Force, those that I have aboard, are knowledgeable, well grounded people. I don't yet have all the civilians that are assigned to the Task Force. LTC (p) Lawrence, who is the Chief of the Systems Integration Team, has worked in the overall tank programming aspect. He is a highly trained officer in Systems Analysis and Operations Research. He is also an experienced Armor Officer. The qualifications of the people I have received for assignment to the Task Force are extremely high.

ARROWHEAD: A lot of talk about officers and civilians on the Task Force, are there any noncommissioned officers working in the program in an advisory capacity?

COL HEIDEN: **I don't know whether you are aware or not, but for over a year as commanding officer of the Armor Agency I have been attempting to get experienced NCO's assigned to the Armor Agency. We have a problem of space and availability for qualified people. Consequently as Armor Agency commander, I adopted a program which borrowed experience, highly qualified noncommissioned officers from TOE units, brought them to Ft. Knox, gave them background and briefings on whatever project we were addressing, and then drew from these very highly qualified noncommissioned officers, extremely valuable insights and reactions to the types of things we have been doing in Combat Developments Command. By all means I would like to see some key noncommissioned officers made available to me. If I cant get them made available, I will borrow them as I did as Armor Agency Commander. Our noncommissioned officers in Armor are the true user. They are the people who have the "hands on equipment" on a daily basis. They are the people who best know our equipment. When an officer reaches the grade of major, and most of our officers in Combat Develpments Command are majors or above, you find that he loses the day to day contact with our hardware. In our hardware programs the noncommissioned officer is an extremely valuable man. The knowledge and experience he brings is worth its weight in gold.**

ARROWHEAD: The Army feels that there is a definite need for a new tank. However, some believe even the Task Force Program will not meet the future requirements of Armor. What are your feelings on this point?

COL HEIDEN: **I feel that we must continue to product improve the M60 A1 tank fleet. The M60 series tank is, of course, the majority of our current inventory of tanks. If we make some assumptions about how much money will be avail-**

The qualifications of the people I have received for assignment to the Task Force are extremely high.

able to buy tanks in the future, it is pretty certain that the M60 series of tanks will be with the Army for a number of years. Consequently, it must be continually improved to keep it competitive on the battlefield. Turning to the new tank I feel that there will definitely be a requirement for a new tank. Don't ask me to put a year for production on it at this stage of the game, for I would be second guessing the results of the Task Force by attempting to do so. I have not settled on the initial operational capability date at this time. However, it is one of the products the Task Force must come up with by 1 August.

ARROWHEAD: Colonel Heiden, wouldn't that then make the MBT Task Force really an elaborate improvement program for the M60 series tank and what the Army will eventually have is really a super modified M60 A1, and A2–

COL HEIDEN: **Not necessarily so, I mentioned previously that there are certain restrictions on the M60 tank fleet that are imposed by the Armor envelope. There are only so many things you can do as a requirement to start making major changes in the armored hull or in the turret. When you arrive at that point you are effectively looking at a new tank design. Effectively looking at the new tank design, it may well be that it is more economical for the Army to look at the overall program. A new tank must provide a significant increase in combat effectiveness and combat power over the M60 series tank. So within these restraints we find that at some point in time a new tank will be required. As I also mentioned, I am not prepared to say when that point in time is. Obviously, the threat that the tank may face on the battlefield is the key element in determining when this point in time will be.**

ARROWHEAD: What will happen on 1 August when your Task Force is completed?

COL HEIDEN: **Our Task Force Mission is to finish our mission by 1 August; at that point in time the work of the Task Force will be turned back over to those agencies in the Army who have a mission in the tank program area. On the Combat Developments Command side it will be primarily the Armor Agency and Combat Systems Group. On the AMC side of the house we don't know at this time; I would anticipate the project management for a main battle tank program would be established. Missions such as the Task Force normally fall outside the normal command and responsibility lines. As of 1 August, however, we must return to the normal way of doing business and that places a requirement on the Task Force to keep those agencies involved with our work and to keep them aware of what we are doing.**

ARROWHEAD: Thank you, Col. Heiden.

MEDICAL EVACUATION: FROM CART TO COPTER

It is the mission of the Army Medical Department to provide health services to personnel in the Army and, as directed in other services, agencies, and organizations. Health services include the manpower, monies, and facilities; preventive and curative health measures; the health services doctrine; transportation of the sick and injured and wounded; selection of the medically fit and disposition of the medically unfit; medical supply and equipment and maintenance thereof; and medical, dental, veterinary, laboratory and optometric services.

When one thinks of the extremely low mortality rate now being experienced in the Vietnam conflict, it is assumed that the advances in modern medicine and surgical techniques are the main contributing factors. It is true that there have been technological advances in the field of medicine, but the biggest contributing factor is getting the patient to the physician in the shortest possible time or a reduction in "patient-to-physician" time.

Ever since the beginning of time, sick and injured and wounded troops have been a burden on the tactical commander. During the Roman times, the injured Soldiers were left where they fell until the battle was over.

Patient evacuation during this period was a Quartermaster responsibility and remained so until the Civil War. Evacuation was recognized as a medical responsibility but a reliable mode of transportation was lacking.

The first evidence of an evacuation system occurred in the Battle of Fort Donaldson. The ambulances of all the regiments were collected by the brigade surgeons and haphazardly organized as ambulance trains that could be used systematically wherever needed. These ambulance trains ran constantly between the dressing stations and field hospitals.

As a result of the Peninsular Campaign, one-fourth of the Army of the Potomac became sick. With twenty thousand sick and wounded located at Harrison's Landing, Jonathan Letterman, Medical Director of the Army of the Potomac, asked The Surgeon General for 200 ambulances. On 3 August 1862 the evacuation of the sick and wounded began—as many as 5,000 men were evacuated in one day. This can be considered the birth of the Army medical evacuation system. By 15 August, the Army was cleared of its sick and wounded. This task proved two things; the important role of evacuation means, and the need for a system to clear the combat area of the sick and wounded.

A General Order of the Army of the Potomac, 2 August 1862, provided for an ambulance corps. The essential features of the ambulance corps instituted by this general order were:

1. An ambulance corps for each Army corps, commanded by a Captain.
2. A First Lieutenant for each division, a Second Lieutenant for each brigade, and a Sergeant for each regiment.

The number of ambulances depended upon the number and size of regiments; three per regiment of 500 or more, two per smaller regiments and one for battery or similar organizations. The first big test of the newly established ambulance corps came during the Battle of Antietam (14 September 1862). The line of battle was six miles long and there were 10,000 wounded. All casualties were collected promptly from the battlefield within 24 hours.

This type evacuation system remained until World War I. Here the emphasis shifted to more mobility and better evacuation. The stated requirements for an efficient sanitary service (now Medical Service) in 1916 were: The mobility of an Army may be the factor which determines its success or failure. It is therefore important (1) that the Army should be relieved as promptly as possible of the encumbrances of its sick and wounded, and (2) that this should be accomplished without obstructing other military operations in progress, and with the minimum of transportation and personnel.

After World War I, the sanitation train was replaced by a medical regiment .The medical regiment had an ambulance battalion organized into a headquarters, two motor ambulance companies and one animal-drawn ambulance company. The function of the battalion was to evacuate to the hospitals and establish ambulance stations.

The Korean Conflict gave birth to aeromedical evacuation of battlefield casualties. For the first time in history, the means of evacuation had a direct link between the patient and the physician and showed a corresponding decrease in the mortality rate. Aeromedical evacuation proved itself so well that the Army Surgeon General developed a helicopter designed for medical evacuation. The UH1 helicopter, designed and developed for the Medical Department proved to be so successful that the tactical units bought it and the Medical Department evacuation units were the last to receive them.

The Vietnam conflict has proven the airmobility concept of warfare and all indications are that mobility will play an even larger role in future wars.

The development of the gunship to provide aerial firepower has opened a new field of Army aviation. This gives us a very effective capability to search and destroy forward of the forward edge of the battle area. Are we to leave out wounded there until the ground forces arrive or are we to evacuate them as quickly as possible? Especially in this era of increased mobility, medical evacuation must have the same degree of mobility as the combat troops.

In order to accomplish its mission, the Medical Service has constantly modified its prescribed methods of operation. When the triangular division became the Army base, a medical battalion replaced the medical regiment. The greatest change was the consolidation of the collecting and ambulance functions. Medical support continued to be modified as the Army base changed. For example, the pentomic and ROAD divisions, medical support, hence evacuation, must continue to change as future concepts are refined.

USACDCMSA has recognized the requirement for a more effective and efficient medical evacuation system in the field Army. Recently adopted methods of providing improved medical support for combat divisions and the proposals of the WORSAMS study have changed the concepts of field army medical support. The reduction of dedicated ground evacuation resources at division level, reassignment of professional medical personnel within the division, the development and employment of new types of medical treatment facilities, i.e. combat support hospitals, coupled with advances in helicopter technology, to include the UTTAS study; have made it necessary to study the medical evacuation system in order to support these rapidly advancing doctrinal and organization changes within the Army health services system.

The Medical Evacuation in the Field Army study will be concerned with the total medical evacuation system to include unit and division level support. The study will develop type units required to provide the most effective, efficient and rapidly responsive evacuation system to support the concept of "pooling" medical treatment specialties while reducing the "patient-to-physician" time.

As maneuver must be used to alter the relative combat power of military forces, mobility of a medical organization can be used to alter the relative capability of the Army Medical Service. Moreover, mobility of medical organizations determines, to a large degree, their effectiveness. The essence of adequate medical support lies in maintaining contact with the combat elements supported. The tactical art of medical employment is the rapid bringing together of patient, doctor and necessary medical supplies. To accomplish this, it is necessary to bring the patient to the doctor (evacuation) or to carry the treatment facility to the patient (close support). Greater numbers of casualties can be seen in a given span of time if the facility is capable of moving to areas of greater demand without dependence upon transportation over which it has no control. Mobility then becomes a primary prerequisite for effective medical service. The degree must be determined by the mission, tactical environment and manueverability of the supported units. The minimum acceptable mobility of the Army Field Medical Service must be equal to that of units being supported. A lesser consideration will result in diminished performance by the Medical Service. In determining mobility of medical treatment facilities, it is necessary to consider the number and type of patients in the facility. The degree attained must include transport for patients as well as means of transporting equipment and supplies. An accumulation of patients without means of transport render the treatment facility immobile.

LTG Norton stated to the AAAA meeting in St. Louis, whatever way the Army goes, "airmobility is the way to go." In order to support a highly mobile force, the Army Medical Department must have equal or better mobility whether it be ground, air or whatever.

NEWS RELEASE

CDC INFORMATION OFFICE, FT BELVOIR, VA 22060 (703) 664-1455

UNITED STATES
ARMY COMBAT
DEVELOPMENTS
COMMAND

FOR IMMEDIATE
RELEASE#4-2-72

Advance Sheet to Magazine Editors

US ARMY COMBAT DEVELOPMENTS COMMAND, Ft. Belvoir, Va...The US Army Combat Developments Command (CDC) headquarters, tenanted at Ft. Belvoir, Va., celebrates its 10th Anniversary on June 9. The unique command identifies and anticipates the combat effectiveness needs for the Army today as well as for some 20 years in the future.

Distinguished members of the Department of the Army staff and former commanders will join the CDC Commanding General, Lieutenant General John Norton, in the anniversary activities at various sites at the Engineer center, a few miles south of Washington, D. C. Theme for the observance is "A Decade of Vision and Progress."

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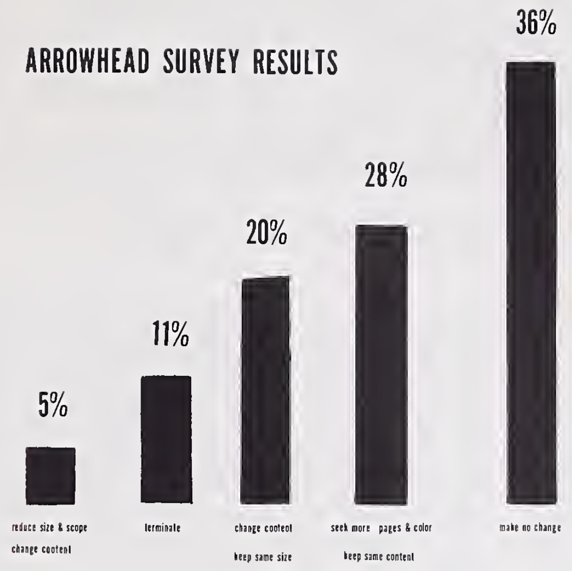
ARROWHEAD SURVEY RESULTS



The Arrowhead staff extends its appreciation to all the readers who took the time to reply to our Readership Survey in the February issue. From the many returns we have gained a better insight into what you, the reader, wants in the Command magazine. We would like to share some of the results with you.

As the graph shows, the largest number of replies favored keeping the status quo of the magazine. However, running a close second was the desire to keep the editorial content the same but to have more pages with more color. The Arrowhead operates on a extremely small budget and the cost of going to a full color production is not feasible. We do have in our new contract with the printers the availability of two colors for the cover. By making good use of the extra color we will be able to put together a more attractive issue in the future.

Twenty per cent of our readers who replied wanted to see the magazine change its editorial content. One of the more frequent responses in this category was that the Arrowhead should key in on the people in CDC. They said the magazine dwelled too much on the materiel side of the CDC picture and that too little was being said about the people behind the scenes. With our limited staff we can not get out to visit each agency to find out about the people involved in the CDC activities. We are highly dependent on the people in the agencies to send us material for publication. The Arrowhead wants to tell your story, but we must get the material from you to be able to do so. We are beginning a new standard feature on CDC people (see Spot Reports-"Spotlight"). You can help by sending in a "Spotlight" on your favorite CDC Officer, Enlisted Man, or Civilian. If you can't write it up, at least tell us who he or she is.

Also within this twenty per cent response was a desire to see the magazine spotlight the various agencies and groups. Other groups and agencies want to know what they are doing and why. We have begun to do this. (See April issue pages 15–17). Many readers are not aware of the functions of the other parts of the CDC structure. The Arrowhead should be able to tell them this information. The way we will do this will be in the format of the Intelligence and Threat Division article.

A small per cent of the returns favored termination of the magazine. One reader replied that the termination of the Arrowhead would be "a step toward the abatement of polution"(sic). This reader did not state why he thought the magazine was a form of pollution nor did he offer any sound criticisms. In the same category, several of the replies cited the cost of publication being a reason for terminating the publication. As was previously mentioned the Arrowhead operates on a very small budget and the cost of publication is most reasonable. What one has not considered, however, is that the Arrowhead is the only command-wide publication. It is the only vehicle of command information at the present time.

The smallest per cent of the returns favored a return to the old format of the Arrowhead, the Newsletter. This is what we left behind last May when we became a magazine. At this time it is unlikely that the Arrowhead would return to that format.

The results of the survey will be analyzed further and some definite changes in the magazine will result from the many suggestions we received. However, we must emphasize that we need the help of everyone in the command. We want your story. We are streamlining the clearance and publication procedures so that the story won't be old by the time it is published. Send us your suggestions for articles. The Arrowhead is your magazine. With your help it can be an excellent publication.

The Forum

THE "OTHER" ARMY

The November 1971 issue of Arrowhead carried an article entitled, "The U.S. Army—The Institution Too Tough to Die." It was written by Colonel J. H. Cochran, Special Assistant to the Commanding General of the Combat Systems Group (COMS GP) at Fort Leavenworth, Kansas.

The article pointed out that the Army, rather than being a dead institution—as cynics might have it—is suffering from several ailments and, consequently, we should muster our imagination and dedication to diagnose the patient and restore him to health, rather than prepare for a funeral.

To those who would discredit the Army, the article might be considered as no more than another apologetic note; to others it might sound unduly optimistic. It must be recognized, however, that the author's observations and optimism about the future of the Army are clearly justified.

Experience has shown that the much-publicized negative aspects of the Army are the exception rather than the rule. This can be verified by a visit to the Models and Information Systems (MIS) Division of COMS GP. The Division consists of a young captain, two lieutenants and three civilians. Most impressive is the esprit de corps of the group. Sitting at those desks are knowledgeable, capable and enthusiastic young people; service is their password and achievement their motto.

Such dedication should be enough to account for the phenomenal increase in services provided by the Models and Information Systems Division. Under the leadership of Lieutenant Colonel William L. Albright, the Division has become a quick service shop for staff members. To the team performing these services, their greatest reward is the satisfaction attained from the timely completion of the various projects which are so urgently required by its users. Thus the team at the "MIS" Division welcomes the ever-increasing workload and the responsibilities. The expansion of the services has been made possible by the persistent efforts of the entire division through a continuing program to make known the capabilities to potential users who otherwise might not have been aware of the variety of services that can be provided them through the computer.

Initially, the MIS division's mission centered around the maintenance and operation of a computerized logistical data base. Since the division became a part of COMS GP in the summer of 1971, the scope of its mission has greatly increased to where MIS is presently proponent for computer software development and maintenance for the COMS GP data bases and models. Some of the major capabilities and accomplishments that have been recorded need to be mentioned at this point.

The data base provides a variety of information including TOE of all units in the active inventory. Available in printout form are equipment and personnel lists, weight, dimension and cube of all TOE items, annual maintenance manhours for organization, direct and general support, unit fuel requirements, unit airlift capability, supply consumption and many additional categories too numerous to mention.

The modification of Modular Force Planning System—commonly referred to as "the Battalion Slice" with ACSFOR as its proponent organization—is one of the recent significant achievements of the division. This valuable model was adapted to the Control Data Corp 300 computer at Fort Leavenworth by MIS staff members during their off duty hours for the purpose of strengthening the MIS capability to support COMS GP force design efforts. In its modified version, this model is being used extensively in support of COMS GP proponent studies. The adaptation of the Battalion Slice Model has enhanced its usability in conceptual force design. Its primary function is to compute the logistical tail for a structured combat force from battalion size through theater Army.

Another significant undertaking of the division is the Individual Unit Action (IUA) Model. IUA is a combat effectiveness model to assist in evaluating the performance of tank and antitank weapon systems. This ambitious project is being undertaken almost singlehandedly by the young captain. Such dedication is typical of the MIS and reflects the CAN DO spirit of the Division. It should be noted here that this information is available to all members of the CDC community within the resource capability of the Division to extract the data.

The purpose of this article has not been to provide a listing of all the projects for which this division is responsible, nor has it been to imply that they have done the impossible, for even the best leadership and the greatest dedication have their limitations. What is indicated is that the Army, beset by several ailments, has a new lease on life through the infusion of young men dedicated, enthusiastic and capable of great achievement, and leadership of a core of professional military and civilian personnel who gainsay the demise of the Army.

The prognosis from this Headquarters is "Continue the Mission."

Submitted by Lt. Nubar Yacoubian, who is now assigned to the Combat Systems Group at Ft. Leavenworth.

The Point of the Arrow

May Questions

1. The advanced technology helicopter engine, for use in the Utility Tactical Transport Aircraft System (UTTAS), is possible because of?

a. Incorporation of large engine, high temperature turbine design principle into a small compact engine.

b. New engine design principles that eliminate the need for high temperatures in the turbine combustion chamber.

c. Advanced engine gear box designs that convert all engine shaft horse power to usable rotor horse power.

d. Rerouting of exhaust gases back into a secondary combustion chamber for additional power and fuel endurance.

2. Acquisition range of an infra-red passive homing missile is most seriously degraded by which of the following?

a. Low ambient air temperature

b. Target speed

c. Water vapor content of the air

d. Absence of visibile light

3. What problem poses the greatest difficulty to use of infra-red passive homing systems against surface targets such as tanks?

a. Exhaust fumes from diesel engines mask the target.

b. Dense air at low altitudes prevents missile control.

c. The missile is unable to distinguish target emissions from background emissions.

d. The position of the warhead in the missile precludes optimization for armor penetration.

4. An electro optical detector named TISEO (Target Identification System Electro Optical) has an automatic track capability that functions on the principle of:

a. Heat given off by target

b. Target contrast

c. Target movement

d. Radio frequency energy of target

5. A xenon searchlight obtains its high intensity light source from:

a. A carbon arc ignition using irradiated pure carbon

b. An inert gas filament

c. A tungsten/rubidium filament

d. Ten thousand candles

April Answers

(1) *Soviet general purpose ground forces are composed of two basic type divisions: the* TANK *Division, and* MOTORIZED RIFLE *Division.*

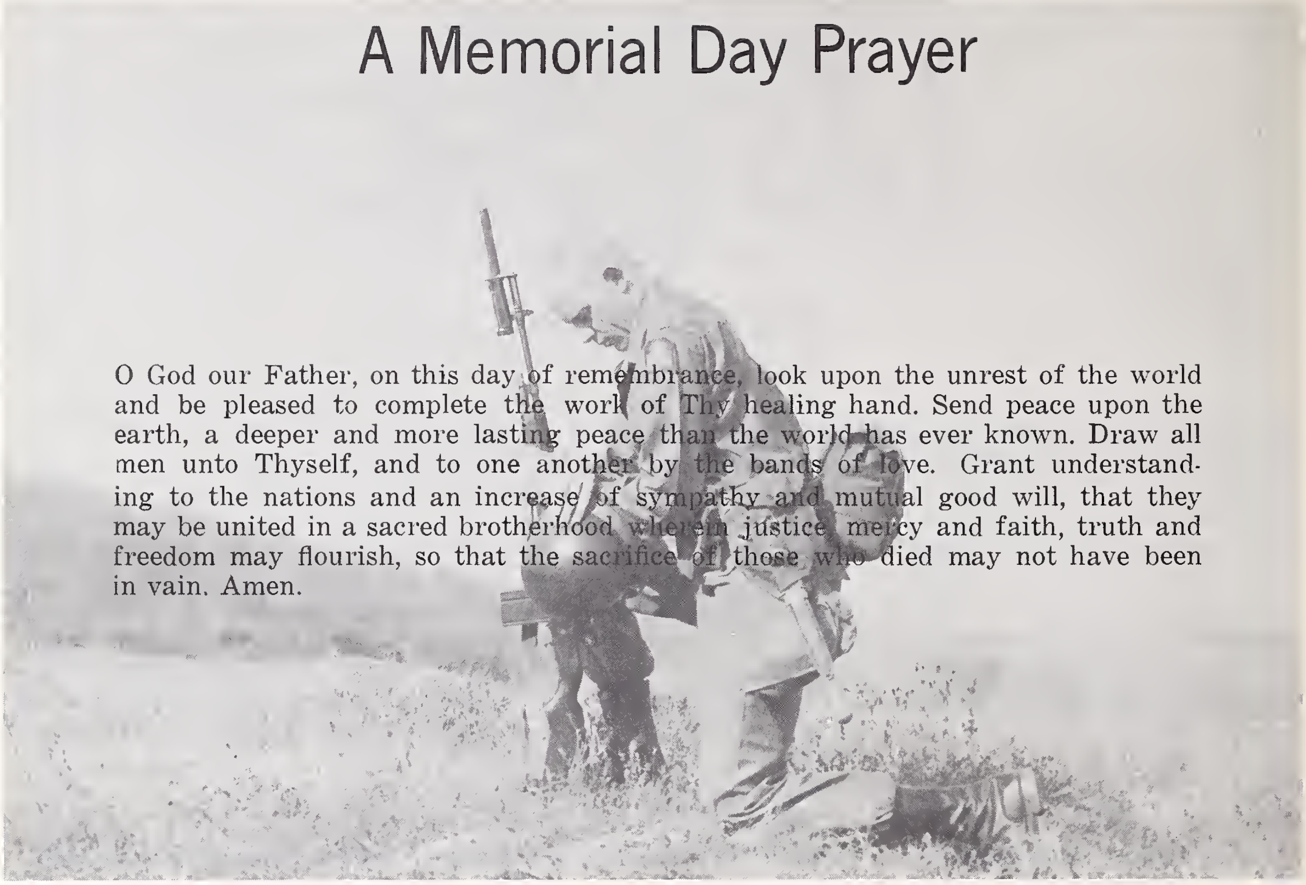
(2) *Soviet doctrine assumes that the* MEETING ENGAGEMENT *will be the most common form of combat.*

(3) *Reacting to the US Army attack helicopter programs, the Soviets recently modified their main battle tank, the* T-62 *by retrofitting it with a* 12.7 mm AA MG.

(4) *The new Soviet Infantry Combat Vehicle,* BMP, *carries a crew of 3 and 8 infantry soldiers.*

(5) *The calibers of the Soviet divisional support field artillery guns/howitzers are* 122 *mm and* 152 *mm.*

A Memorial Day Prayer



O God our Father, on this day of remembrance, look upon the unrest of the world and be pleased to complete the work of Thy healing hand. Send peace upon the earth, a deeper and more lasting peace than the world has ever known. Draw all men unto Thyself, and to one another by the bands of love. Grant understanding to the nations and an increase of sympathy and mutual good will, that they may be united in a sacred brotherhood wherein justice, mercy and faith, truth and freedom may flourish, so that the sacrifice of those who died may not have been in vain. Amen.

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PROFESSIONALS FOR PEACE

DEPARTMENT OF THE AIR FORCE
MCMXLVII
UNITED STATES OF AMERICA

ARMED FORCES DAY

UNITED STATES COAST GUARD
SEMPER PARATUS
1790

20 MAY 72

Spot Reports

Visiting General

Ft. Ord, Calif.—Lieutenant General John Norton, Commanding General of the Army Combat Developments Command at Fort Belvoir, Virginia (parent unit of CDEC its Experimentation Command headquartered at Fort Ord) was at CDEC's field laboratory on the Hunter Liggett Military Reservation near King City on Thursday and Friday, March 30th and 31st. His host, CDEC's commanding general, Brigadier General Ray Ochs (at right with the Experimentation Brigade's commanding officer, Colonel Charles G F Wahle, partially hidden) escorted the visiting general on his tour of the facility. Here General Norton is looking over the new enlisted men's barracks recently completed and receiving details from Captain Edward Sullivan, commanding officer of CDEC's Instrumentation Company. Behind them is Command Sergeant Major Richard B Gilland. At left is the commanding officer of the Experimentation Battalion, Lieutenant Colonel Joseph A Villa; and at the rear of the group, Colonel John H Hoye, CDEC's Deputy Commanding Officer discusses plans with Major Henry M Reed II, General Norton's Aide-de-Camp. General Norton also viewed with interest the new short order dining hall recently constructed for experimentation soldiers' after-hours pleasure and their mess hall and day room. He was also briefed on current experimentation. Accompanying General Norton on his CDEC tour, but not shown here, were Colonels Jack L Leggett, John O Shoemaker and William C Boehm all from CDC at Fort Belvoir.

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Unit of Choice

You don't have to be in the top three enlisted grades to take advantage of the Army's new CONUS station or area of choice reenlistment option. In fact, under the new ruling you have to be E-6 or below.

In the new ruling the Department of the Army makes the reenlistment option available to personnel with six years or less service in CONUS and allows them to select another station of choice in CONUS. Under the new plan a 12 month assignment at the CONUS station is guaranteed. However, personnel in CONUS must be within 12 months of ETS to reenlist under the new option.

If completing a normal overseas tour in any area, applicants for this option may have over six years service but must be in the E-6 or below pay grade. If serving overseas, the individual must complete a normal tour, or if applicant has six or less years service, he must have an ETS prior to completion of a normal tour.

Additional prerequisites include being qualified in an MOS for which a requirement exists at the CONUS station or area of choice for which applying. The applicant also may have no assignment limitation which will preclude assignment to his chosen CONUS station or area of choice.

Under Army regulations if an individual serving overseas with six years or less service will complete a normal overseas tour, he is authorized to be discharged for the purpose of immediate reenlistment for the option.

The area of choice guarantees a minimum 12 month stationary assignment except, when the unit is deployed, the individual will be required to move with the unit.

Here's the chance to be assigned to that special post or special unit you've been wishing you were in. Talk to your career counseler; he will explain it all.

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Tests

Ft. Ord, Calif.—During the period 3 April to 3 June 1972, a team from the US Army Combat Developments Experimentation Command (USACDEC), based at Ft. Ord, Calif., will be conducting intervisibility measurements at various sites within the Federal Republic of Germany.

The Combat Developments Command has tasked CDEC to conduct a field experiment as a part of a continuing evaluation of the combat effectiveness of the Shillelagh, TOW and Dragon antitank missile systems to aid in decision making for the procurement, development and employment of the systems.

No tracked vehicles will be utilized in areas where maneuver rights do not exist. Wheeled vehicles will be utilized on existing roads and trails. The manner in which intervisibility readings will be obtained is as follows: wooden panels will be erected at one end of a 2 km x 5 km site. Ten simulated vehicle routes will then be established from the far end of the site toward the panels by personnel on foot. Each route will be marked every 25 meters with metal rods. Following site set-up, data recorders will take visibility readings to the wooden panels from each of the 25 meter points.

It should take one day to set up the site, one or two days to record the data, and one day to remove the equipment. This leaves one day each week, slippage to compensate for weather, etc. The team should therefore, be at each site approximately one week.

The CDEC Team, composed of six officers and ten enlisted men, plus 7 civilians, will be augmented by 70 to 80 men from USAREUR units there. The team performing this experimentation is Project Team II under the Deputy Chief of Staff for Experimentation, with Colonel Arthur W Buswell, Chief of the Experimentation Division in Charge.

All personnel will be thoroughly briefed on the necessity to minimize maneuver damage. Since no vehicle will be utilized off existing roads or trails in areas where maneuver rights do not exist, damage to land, forests, fencing and crops is not expected to occur.

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Spotlight

Ft. Belvoir, Va.—The *Arrowhead* in response to the many comments regarding the need for more emphasis on the people within CDC has instituted a new column. This column will be called "Spotlight On . . . ". We ran our first one in the April issue on a unique Specialist at the Nuclear Agency. We want to know about the unique civilians, enlisted personnel, and officers at your agency. So look around and find that certain someone that the *Arrowhead* can spotlight. All information and a picture should be sent to the Arrowhead, Headquarters, CDC, Ft. Belvoir, Va. We need your participation to get these people "in the spotlight."

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Ceremony

Ft. Belvoir, Va.—An awards ceremony was held this past month in the Intelligence and Control Systems Group conference room to recognize outstanding performance by civilian personnel assigned to the INCS Group Headquarters.

Mrs. Robert Moore, 3rd from left, secretary in the Control Systems Directorate, was awarded a Quality Step Increase. Mrs. Richard Russell, 2nd from left, secretary in the Office of the Deputy Commander; Miss Alice Caton, from the Control Systems Directorate, 2nd from right; Mr. Verdell Norton, far left, from the Operational Support Directorate, were recognized with an Outstanding Performance Rating. Mrs. Paul Allison also received an Outstanding Performance Rating but was not present for the picture taking. Colonel A. J. Vitullo, Deputy Commander, INCS, presented the awards.

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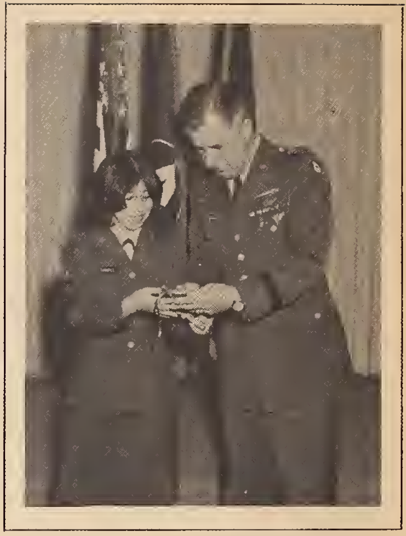
Award



Ft. Belvoir, Va.—Specialist Four Maria D. Ramirez (left) receives the George Washington Medal from Lieutenant General John Norton at ceremonies recently held at HQ, Combat Developments Command. The medal is awarded by the Freedom Foundation for achievement in essay writing. Specialist Ramirez wrote her essay while in Advance Individual Training at Ft. McClellan, Ala. The theme of her essay was "What It Is To Be An American".

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First Visit

Aberdeen Proving Grounds, Md. . . . General John Norton, CDC's Commanding General, made his first visit to the CDC Maintenance Agency since assuming command of CDC. The purpose of his visit was to have a first-hand look at the principal activity within the Combat Developments Command that is charged with accomplishing the maintenance support aspects of the CDC mission.

While at the agency, he was

briefed by Colonel Donald H. Greeley, who was the Commanding Officer of CDCMA at that time. The various division chiefs also brought the general up-to-date on major projects underway at the agency.

General Norton took advantage of his visit by personally addressing and greeting all members of the agency who had assembled at Dixon Hall for the occasion. For many members of the Maintenance Agency this was their first meeting with their Commanding General.

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CDC Lts.

Ft. Belvoir, Va.—Job satisfaction and the need for an effective sponsors' program were the key topics when Lieutenant General John Norton met with the lieutenants assigned to the CDC Headquarters at Fort Belvoir.

In an early morning coffee the "stars and bars" got together to discuss the role the lieutenants play in the CDC mission. The lieutenants expressed their desires to have more responsibility in their daily duties within the Command. In a survey conducted by the CDC Junior Officers' Council, it was found that 80% of the junior officers were satisfied with their jobs. The survey also revealed that none of the officers felt that they had too much responsibility. "The lieutenants want to get the most out of their tour of duty here at CDC," commented LT. George Penick, who led the discussion. "We want to be used in a way that will be beneficial to us as well as to the Command," he said.

CDC is unique in the fact that many lieutenants hold jobs that would normally be filled by field grade officers. The educational and civilian backgrounds of these young officers qualify them to fill these jobs. However, it is up to each commander to realize the potential of these young officers and to take advantage of it.

The lieutenants expressed a desire to see an effective sponsors' program in which newly assigned lieutenants would be briefed by other lieutenants on what CDC is and does. The lieutenants said they would be responsible for setting up an effective program to educate new officers about their new command.

The discussion was most beneficial, for it gave the General the opportunity to see the spirit of the young officers at the Headquarters. "I am always eager to get good ideas about anything—particularly about how to improve the Army and our National Defense. But we are made up of people and how well we deal with people and how well we communicate. Frankly, how efficiently we employ people is the key to all of it," the General stated.

By getting their ideas out in the open, the lieutenants and the General were making positive steps in that direction.

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Survivability

Ft. Ord, Calif.—A new aircraft survivability test will soon be conducted by the Army Combat Developments Experimentation Command at their Hunter Liggett Military Reservation field laboratory, according to Lieutenant Colonel John M Toolson Jr, Experiment Control Officer of Project Team IV, Deputy Chief of Staff for Experimentation.

He stated that the test is to evaluate the capabilities of two helicopters—the AH56–A Cheyenne and the Multi-weapon Fire Control Cobra (AH–IG). The test is designed to evaluate the capability of these two helicopters to navigate a short course, make a long range detection of a target, re-detect the target and simulate engagement of the target. In these activities the Cheyenne and the Cobra will fly at or below 100 feet above the ground at speeds between "hover" and 180 knots.

The trials are scheduled to begin on April 3d and will continue five days a week, Monday through Friday, until about May 19th.

During the conduct of trials, the Cheyenne will employ a laser range finder. Although lasers have been used at Hunter Liggett in the past, they have been of such low magnification that no hazard existed. The laser used by the Cheyenne is a concentrated beam necessary to make accurate measurements. This laser *could* cause damage to unprotected eyes if direct contact were achieved. To insure that this does not happen, the use of this laser will be restricted to the Gabilan impact area.

In order to prevent persons from inadvertently entering the Gabilan impact area during the conduct of the trials, roads leading into the area will be barricaded or guards will be posted to stop all traffic or both.

Roads leading south toward Gabilan off the Nacimiento-Fergusson Road will be closed, as will the roads leading north off the Sam Jones Road. Further, roads leading west from the unimproved road which runs just west of the San Antonio River connecting the Nacimiento and Sam Jones Road will also be closed.

There will be no unusually loud noise as has occurred in some past CDEC aircraft experiments over Hunter Liggett; there will be no live firing; and no flights will be scheduled over populated areas.

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Flick Pick

Highly recommended for all in the developments trade is the US Army Big Picture film just released called *Materiel Readiness* featuring the 1st Infantry Division on REFORGER Exercises in Germany. The film, highlighting the Army's Logistics Offensive, has appeared on Washington-Baltimore area TV and is available to most CDC elements in their post's Audio-Visual Support Center. Ask for TV #822. Schedule a showing soon. Consider even showing it in your friendly, nearby snack bar and let others get up to date also.

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Moving

FT. HUACHUCA, Ariz.—Military families on the move around the world last year took with them over 1.2 million tons of personal property.

The Army, through the Military Traffic Management and Terminal Service (MTMTS), determined how this fantastic amount was to be moved. And they did it using a resources conservation program saving taxpayers $4.4 million.

Much like the airlines' data systems, military transportation data is transmitted through the Defense Communications System using some of the Army's most modern automatic digital computer network. (above)

The key to the complex system is communications and is the responsibility of the U.S. Army Strategic Communications Command Communications Agency - MTMTS, whose director is Dewey Allread Jr. While the agency is under the command guidance of STRATCOM headquarters at Ft. Huachuca, operational control is exercised by the commander of MTMTS.

MTMTS' extensive operation is coordinated through communications using AUTOSTRAD, or the automated system for transportation data.

AUTOSTRAD has six major functional categories having many subsections within each. The first of these is the passenger traffic management system, or PASTRAM. This facet of AUTOSTRAD performs services similar to the commercial airlines reservations system, and provides similar information for rail and bus. Group fare and charter information is also handled by PASTRAM.

FAST, the freight automated system for traffic management, aids MTMTS in supervising and managing military freight movement.

An important MTMTS responsibility is planning for adequate storage facilities at terminal shipment points throughout the world. For this job, the terminal management system, or TERMS, equipment is used.

The fourth AUTOSTRAD information subsystem is WHIST. The worldwide household goods information system for traffic management stores information on commercial movers' rates, statistics and performance. WHIST has enabled MTMTS to improve services to the military through close supervision of movers' performance. The system has also helped to reduce loss and damage of goods.

MODS, the mobility planning data system, is a special management information program designed to support MTMTS' planning responsibilities.

The sixth system, the command and administrative data system (COADS), automates information for the MTMTS comptroller and personnel offices.

Communications being a vital factor to the continuing success of MTMTS' operation, top priority attention is paid to advancements in the communications field. One advancement of singular significance to the STRATCOM Communications Agency-MTMTS is the Army telecommunications automation program (ATCAP). ATCAP is the program to provide a system which will transmit voice, message and audio-visual communications over a single network.

The STRATCOM Communications Agency-MTMTS will be the first in the Army to use the futuristic automated telecommunications center in the first phase of ATCAP.

Through this highly effective communications system, MTMTS expects to be able to achieve better utilization of transportation resources, even more economically and efficiently than is now done. While Army-wide use of ATCAP systems is not expected before 1980, the STRATCOM Communications Agency-MTMTS anticipates completion of the first phase installation in Oakland, Calif., in 1973.

Modernization and automation of Army communications - electronics is one of STRATCOM's major programs to streamline operations in accordance with defense budgetary cutbacks. As the commanding general of STRATCOM states, "We are planning today to meet expected personnel losses with a combination of command-developed management techniques and greater use of automation."

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CDC

"THINK TEN"

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